

GNB Battery Technology

by Gwen Robinson

One small but outstanding success story among foreign companies in Japan is also one of the most unlikely, unfolding as it did in the relatively neglected field of emergency back-up power generation. The story is about a 100% foreign-owned company which managed, with 100% imported products and a great deal of encouragement from one of Japan's largest companies, to capture prime market share from Japanese competitors.

Until the Great Hanshin Earthquake which devastated the port city of Kobe in January 1995, little attention was paid to the efficacy of the main source of emergency power supplies: large industrial batteries. The market up to the early 1990s was dominated by a few Japanese companies that supplied traditional acid batteries, known as flooded batteries, as stand-by power

mainly for telecommunications systems. These high-maintenance batteries required topping up nearly every day with water and acid, provided manually by teams of workers.

In 1990, one newcomer, GNB Battery Technologies, set up in Tokyo to try to break into the market with new-generation, sealed, valve-regulated lead acid batteries imported direct from GNB's factories in the United States and Britain. Domestic telecommunications giant NTT was one of the handful of companies willing to experiment with the new product, and installed some GNB sealed batteries in Kobe. But the prevailing assumption among customers for emergency back-up power supplies, including power utilities and telecommunications carriers, was that the traditional flooded batteries were reliable enough to survive any natural disaster.

The Kobe quake disproved that assumption, destroying some of the thousands of old, flooded batteries that were intended to supply emergency power for the region's telecommunications system. As a result of the damage, more than 200,000 phone lines in and around the city were down for almost 24 hours in the immediate aftermath of the quake. Ensuing investigations revealed that Japanese-made acid batteries sustained the most damage, while every one of GNB's sealed batteries survived the quake intact.

The evidence was enough to prompt NTT to decide to gradually replace its old-fashioned acid batteries with the new-generation sealed batteries. NTT showed considerable confidence in GNB, installing its batteries in vast, underground vaults in the Tokyo business district of Otemachi, where



The Great Collapse: The Kobe quake not only shattered homes but also reliance on traditional electric batteries

they functioned as the power back-up for the Emperor's palace nearby as well as the prime back-up supply for telecommunications for the city's leading finance companies and banks. The Otemachi site, regarded as one of the most vital back-up power centers in Tokyo, is encapsulated in steel and rubber, and features a shut-off mechanism that seals off the building in the event of a disaster.

Along the way, however, there were many hard lessons for the foreign company, according to Oku Shoichiro, who heads GNB Battery in Japan, and Ogasawara Masanori, general manager of the power engineering and services division of NTT Facilities, which was spun off from NTT in 1992 to deal with matters such as back-up power supply and emergency generation. To meet NTT's exacting standards and requests, GNB made numerous revisions and modifications to its battery technologies.

Among the major changes, GNB altered many production lines to modify its industrial batteries for the Japanese market and raise standards of quality control, Oku said. In short, the company changed nearly every aspect of battery manufacturing, from product design to plant process control and packaging. One key innovation has been the production of much smaller industrial batteries, capable of generating the same amount of power as the models they superseded. At barely more than 160cm high and 70cm long, each block of 23 cells in a system is 60% the size of the smallest equivalent produced by GNB's main rivals. The company last year invested about \$5 million in research, development and production improvements at its facilities in Arkansas and Georgia in order to meet production increases that the NTT project required.

The hard work has paid off. GNB's battery technology won a design award from NTT and now claims the highest global market share of any large, sealed battery product line.

"These new-generation industrial batteries are really very new technology, there have been many problems in their

development...some people don't have complete faith in them because of earlier problems. But NTT has been keen to chase development of new technologies. GNB went through growing pains here to get it all right and now, we feel we have a product we can rely on 100%," Ogasawara said.

"Telecommunications is always moving, it has to be maintained and the role of power supply is very important in this industry—it includes computer systems and associated functions. In the case of power outages, most large buildings in Japan are equipped with generators, but even generators are not sufficient. They take time to start up, they can fail and encounter problems," he continued.

"We really looked all over the world for someone who could meet our specifications. We now have GNB and three domestic suppliers for sealed batteries and through them, have become world leaders in using these new type batteries for standby power supply...now, telecommunications carriers in other countries are following, but they will be slower," he added.

Already, in industries that are particularly reliant on standby power, such as the medical, computer, telecommunications and power-generation fields, there is wide acknowledgement that sealed batteries are a low-cost, low-maintenance alternative to old-fashioned flooded batteries. Unlike the flooded batteries, they do not require daily maintenance and are not susceptible to temperature changes. Strong heat or vigorous shaking—in an earthquake, for example—can severely damage acid batteries.

In its investigations after the Kobe quake, NTT's engineers found that many of the traditional flooded batteries tipped over and were rendered useless. Compounding the problem was the damage sustained by many emergency generators at the height of the quake. "Even though we'd planned for such emergencies, we found many people couldn't use their phone lines," Ogasawara said. "In some buildings,

where we had both sealed and flooded batteries, the old batteries were damaged whereas the sealed ones were fine. Studying these things reinforced our decision to boost investment in sealed batteries."

Shortly after the Kobe quake, NTT Facilities put out public tenders for its project to replace old, flooded batteries with the new, sealed variety, even though the company had already formed a relationship with GNB. There were bids from other international battery makers, according to Ogasawara, but other foreign contenders lacked technological sophistication and cost competitiveness, he said. "So for this project, we chose GNB and three domestic companies."

GNB, which is wholly owned by Australian multinational Pacific-Dunlop but is headquartered in Atlanta, Georgia, has since surged ahead in Japan's market.

According to GNB's Oku, sales grew from zero in 1990, the company's first year of operation in Tokyo, to \$20 million in the last business year to June and are expected to jump another 10% in the current year. Japan now accounts for 30% of GNB Battery's worldwide sales, and with a total market share approaching 13%, the company stands as the only foreign supplier of industrial batteries to the country's leading telecommunications and transport companies.

On top of GNB's rapidly growing customer base, the latest deal with NTT Facilities is expected to raise sales to \$30 million annually—and more projects are in the pipeline. Further expansion will come from the nascent boom in mobile telephones and a new project GNB will launch next year to install extra-small sealed batteries in telegraph poles.

In the U.S., GNB is a leader in supplying automotive batteries to car makers, including leading Japanese companies such as Toyota. But the automotive battery business is mainly confined to the US domestic market, Oku said. "Our small, modified industrial batteries you see here have been produced solely for NTT, but

from the end of this year we will be selling them all over the world," he added.

GNB also supplies back-up industrial batteries to the U.S. military for use in nuclear submarines and satellite communications systems around the world. Further afield, it has had considerable success in the last two years in China and South Korea, mainly due to rapid growth in the mobile telephone market, which requires considerable back-up power. Other areas targeted for growth include Europe and India, as well as Southeast Asia.

Overall demand for back-up emergency power supplies is soaring amid growing reliance on sophisticated computer networks, Oku said. Among GNB's leading clients are two of Japan's largest railway companies, West Japan Railways and Central Tokai Railways, which use GNB batteries to back up the huge computer networks that run the *shinkansen* bullet trains. Apart from NTT, other large customers include new telecommunica-



Fitting the socket: GNB's sealed batteries meet NTT's needs

tions carriers in the recently deregulated telecom market, as well as leading utilities such as Tokyo Electric Power Company (TEPCO) and Kansai Electric Power Company (KEPCO).

However, competition is now intensifying as leading Japanese manufacturers, including Japan Storage Battery, the country's largest maker of industrial and automotive batteries, develop more competitive versions of new-generation sealed batteries. Japan Storage last year began marketing a line of long-life sealed batteries featuring a 13-year duration.

Worldwide, the business of providing portable power sources is going through what many see as a revolution, with numerous new electrical and chemical technologies fuelling fierce competition. Powerful industrial batteries are also being eyed as potential sources of non-polluting electric power for vehicles, including industrial lift trucks and a range of other

applications.

In Japan, Oku at GNB is confident that the company's foreign-made products will maintain their technological edge. "Basically, all businesses these days need stand-by and back-up power. The competition is becoming very fierce, but GNB Battery Technologies is still the industry leader in Japan," he said. ■

Gwen Robinson is a Tokyo-based correspondent for the Financial Times. She previously worked for The Times of London as a Japan correspondent.



GNB's Oku (left) and NTT's Ogasawara (right)